

Nutrients and the Chesapeake Bay

Just like people, plants and animals that live in rivers, lakes and bays need nutrients to grow. However, too many nutrients can be harmful. The Chesapeake Bay contains excess nutrients, making it and portions of its tidal rivers “impaired” or unhealthy. This means that there are fewer fish, crabs and healthy habitats to support Virginia’s fishing and tourism industries, damaging a way of life for many people.

Reducing nutrients

Virginia and other Bay states must reduce the nutrients that are released into the Bay and its rivers. Nutrients, the most common of which are nitrogen and phosphorus, primarily enter the streams and rivers feeding the Bay in two ways:

- Through the discharge or release of treated wastewater from a facility (called a point source).
- From the water that runs over farm fields, forestlands, subdivisions, construction sites and city streets (called nonpoint sources), and eventually into streams as runoff or through ground water.

Virginia is addressing both pollution sources. The Department of Environmental Quality is responsible for reducing nutrients from municipal wastewater treatment plants and industries within the five Virginia watersheds that drain to the Bay.

DEQ, with its state and federal partners and stakeholders, has taken four significant steps to reduce nutrient pollution:

- Estimated the nutrient amounts that could enter the Bay each year without harming wildlife or violating water quality standards.
- Determined the nutrient amounts each Virginia watershed could contribute and still maintain healthy waters.
- Divided the nutrient amounts among each watershed’s major wastewater treatment plants and industrial facilities, setting a cap or limit that could be released from each plant or facility and from each watershed.
- Created a nutrient trading system to enable nutrient reductions at the plants and facilities.

A review of the first three steps is scheduled for completion by the end of 2010 as part of an ongoing process led by the U.S. Environmental Protection Agency to develop a Total Maximum Daily Load. This TMDL will represent the total

Nutrients: The problems they cause



Image courtesy Chesapeake Bay Foundation

Excess nutrients can cause the growth of small plants on the water’s surface called algae. Often green or brown in color (shown above), large amounts of algae can block sunlight from seagrasses, preventing their growth. As algae die and decompose, dissolved oxygen in the water decreases, making it difficult for fish and other animals to live in the water.

Nutrient pollution has caused the decline of habitat conditions in deep water for finfish and shellfish and in shallow water where seagrasses sustain young fish, crabs and other species. These changes affect Virginia’s food production and tourism industries as well as the quality of life for Virginians living on or near the Bay’s shores. More information about the Chesapeake Bay is available at www.chesapeakebay.net.

amount of nutrients the Bay and its tidal rivers can contain and still meet water quality standards.

Using input from stakeholders, DEQ established regulations and permits for wastewater treatment plants and industries to follow. A permit is a license or an authorization for a facility to operate in Virginia. It may place restrictions on operations and may require pollution control technology.

The regulations and permits apply to more than 120 treatment plants that discharge a significant amount of wastewater into rivers and streams within Virginia’s portion of the Bay watershed. These plants are called “significant dischargers” by state and federal regulators. More than 90 percent of nutrients released into the Bay watershed by point sources come from these facilities. These regulations also apply to smaller plants proposing to expand and new plants that have been planned.

In order to meet the goal of a restored Chesapeake Bay, current expectations are that greater reductions will be needed from all nonpoint source categories than can be achieved through existing funding levels and programs.

Nutrient trading

Most wastewater treatment plants must install new technology to meet nutrient limits. The trading program will help facilities meet these limits while reducing construction costs. In general, nutrient trading is the transfer of “nutrient credits” to a facility from other facilities and, in some cases, from farmers and landowners.

Each significant facility has a limit on the amount of nutrients that can be released with its wastewater, and each watershed has a limit on the amount of nutrients that it can contribute to the Bay. When a facility reduces its nutrient discharges to below its limit, the extra reduction may be sold to other wastewater treatment plants. This extra reduction is considered a “nutrient credit,” measured in pounds. While the amount of nutrients released from individual facilities may vary, trading ensures that the total amount of nutrients that enters the Bay from each watershed meets the overall “watershed limit.”

A facility needing to purchase nutrient credits could do so through “trading” or buying credits from other plants or facilities within the same watershed. The Virginia Water Quality Improvement Fund will serve as a last resort source of credits, when available. The fund will sell credits from nutrient reductions to facilities that cannot find a trading partner. Facilities also must compensate for any additional discharge of nutrients resulting from new construction or expansion. They may do so by acquiring nutrient credits from significant dischargers or from landowners, including farmers.

Agricultural producers and other landowners will have nutrient credits available if they implemented improved pollution control practices on agricultural fields. These practices, called best management practices, may range from installing fencing to keep livestock out of streams to planting cover crops. Farmers will also benefit from more efficient agricultural practices without having to pay the full cost of implementing them.

Money for construction costs

Both the Commonwealth and localities that own wastewater treatment plants will contribute money for the costs of upgrading facilities.

Construction costs for installing the nutrient control systems needed by the significant dischargers could reach about \$2.1 billion. Estimates for the Commonwealth’s share of the construction projects range from \$750 million to \$1 billion. Depending on need, Virginia will pay 35 percent to 75 percent of eligible construction and equipment costs via the Water Quality Improvement Fund. Ten percent of Virginia’s annual budget surplus is deposited in the fund, and there have been additional deposits to the fund in the last few years. There is also money available in low- to zero-interest loans from the Virginia Clean Water Revolving Loan Fund to support projects that will involve nutrient reduction efforts for financially strained localities.

Up to \$250 million in bonds is also available to help finance the state’s share of wastewater treatment plant upgrades. These bonds will give localities assurances that money will be available in the future and will help ensure that the Commonwealth upholds its financial obligations to localities. In addition, the trading system could reduce the construction costs by about \$520 million. Because facilities are able to buy credits as an alternative to installing additional pollution control technologies, the demand for construction materials and services will decrease.

Current efforts

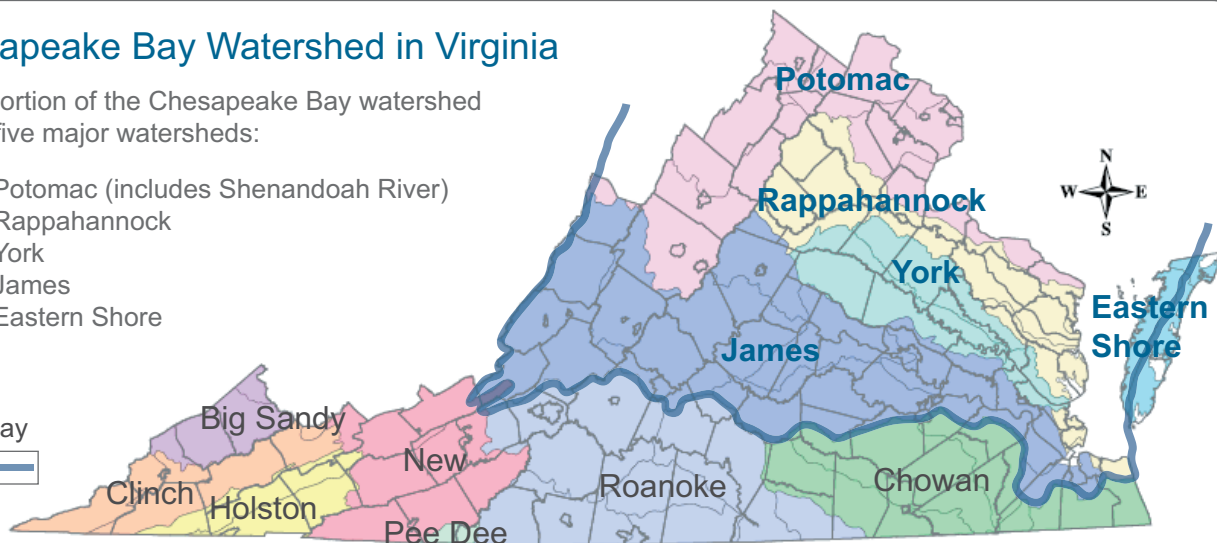
Localities are applying for funds and grants and are upgrading their wastewater treatment plants. The nutrient trading program will be fully operational in January 2011, when all the point source nutrient caps become legally effective. Adjustments in Virginia’s nutrient control programs may be needed based on the results of EPA’s TMDL for the interstate Chesapeake Bay.

The Chesapeake Bay Watershed in Virginia

Virginia’s portion of the Chesapeake Bay watershed includes five major watersheds:

Potomac (includes Shenandoah River)
Rappahannock
York
James
Eastern Shore

Chesapeake Bay watershed



Watershed map courtesy Virginia Department of Game and Inland Fisheries and the U.S. Geological Survey